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MOWING ADVISORY GUIDELINES IN TURTLE HABITAT: PASTURES, SUCCESS IONAL FIELDS, AND HAYFIELDS

Grasslands, shrublands, pastures and hayfields are important habitats for turtles, particularly the Wood and Eastern Box Turtle. Turtles require sparsely vegetated areas with some bare soil for nesting and many prefer early successional fields, hayfields, and shrublands as feeding areas during the late spring and summer months. The natural succession of grasslands, shrublands, old pastures, and fields reduces the availability of these critical habitat types forcing turtles to travel longer distances to find similar habitat elsewhere. As the travel distance increase so does the likely hood that they will cross roads putting them at risk of being hit by cars. Therefore, the maintenance of these habitat types is important, often requiring periodic mowing; although other methods of control are possible (e.g. prescribed burns, grazing). Mowing during the spring and summer months can also cause significant turtle mortality; up to 10% of a western Massachusetts population (Jones 2007). In fact researchers are finding that the percent of mortality due to mowing is much higher than the percent of mortality due to roads. The following guidelines are intended to avoid or minimize any detrimental effect of habitat management on Wood or Box Turtle populations. These measures will likely benefit other turtle species, such as the musk turtle and spotted turtle. Native plant communities and all native species, particularly state-listed species, should be considered when developing management plans for conservation lands. These guidelines provide a suite of options, each of which will help reduce turtle mortality. We recognize that all options will not be appropriate for every circumstance and that land managers may need to modify these guidelines to manage sites to accommodate the needs of other species.

For more information about Wood Turtles and Box Turtles and the types of habitat they use see the NHESP Fact Sheets:
Wood Turtle http://www.mass.gov/dfwele/dfw/nhesp/nhfacts/glyptemysinsculpta.pdf
E. Box Turtle http://www.mass.gov/dfwele/dfw/nhesp/nhfacts/tercar.pdf

An information request form can be submitted to the NHESP for persons interested in finding out if they have state-listed turtle species on their property; the form may be found at http://www.mass.gov/dfwele/dfw/nhesp/inforeqform.pdf

For more information on management of these habitats, land managers can refer to the recently released *Managing Grasslands, Shrublands, and Young Forest Habitats for Wildlife: a Guide for the Northeast* available for download at:
http://www.wildlife.state.nh.us/Wildlife/Northeast_Hab_Mgt_Guide.html

For more information about Habitat Management for Amphibians and Reptiles see the *Habitat Management guidelines for Amphibians and Reptiles of the Northeastern United States* available for order at http://www.parcplace.org/habitat_management_guide.html

Lands Managed as Turtle Habitat: Lands where the primary objective is turtle habitat (such as nature preserves, wildlife refuges or private lands where the landowner wish to optimize turtle habitat and abundance).

1) *Mowing Rotation* – Mowing to maintain field habitat for conservation reasons should only require multi-year rotations (e.g. mowing once every 2-3 years)*. If mowing is combined with another maintenance method such as chemical control** of invading woody plants, mowing during the turtle active season may not be necessary. If periodic mowing is the sole method used for maintenance, woody plant cover on the site will likely increase over the long-term, and mowing during the active season will be necessary to inhibit woody plant invasion. In some years, very frequent mowing may be required to reduce woody plant abundance. If this repeated mowing treatment is required in a given year, vegetation should be mowed frequently enough that it does not provide habitat for turtles in that year, provided that turtle habitat is present adjacent or nearby to mitigate the temporary loss of use of the site

2) *Percent Mowed* - For sites with > 10 acres of grassland/fields it is recommended that no more than 25%-50% be mowed in any given year. For example, when possible mowing that occurs during the active season should be limited to approximately 25% and areas mowed during the inactive season approximately 50%.

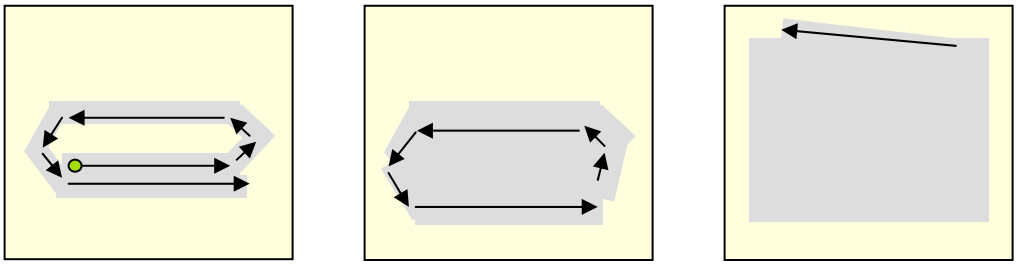
3) *Timing* - The best solution is to avoiding mowing during the peak time when turtles are using fields.

Peak Time for field use by turtles
May 15th – September 15th

4) *Mower Style* – If mowing on a multi-year rotation, avoid flail mower heads with guide bars that ride along the ground. Sickle-bar mowers will likely have the least impact if mowing grassland and fields every 1-5 years. In areas with more woody vegetation >1-2” diameter a Brontosaurus-style mower will likely have the least impact on turtles.

5) *Mowing Height* – If mowing during the active season is necessary, retention of mowing stubble to 7 or even 12 inches will reduce mortality, reduce blade wear, and will leave important cover for animals.

6) *Directionality* - If mowing during the active season is necessary, start mowing from the center of the field and use a back-and-forth approach, or large circular pattern, to avoid concentrating fleeing animals where they may be killed or stranded. In addition, leave an unmowed 30 ft strip around the perimeter of the field and mow this area last. Most turtles are found in these areas and this provides time for them to react to the mowing activity and move out of the area (see diagram below).



There are three exceptions to this general rule. The first is when a stream is near the field; in these cases it is best to start mowing the side furthest from the streams edge first and work your way towards the stream. The second exception is when the field is bordered by woodland, start mowing the sections of the field furthest from the woods and mow towards the woods. The third exception is when the field is bordered by a road; In this case start mowing the section next to the road first and work your way across the field.

7) *Mower Speed* – Mowing in low gear or at slow speeds will allow turtles to react and move out of the field.

*We recognize that this mowing rotation may be beyond the capacity of the mowing equipment to which a land manager has access. Grant programs are available that may assist in providing funds to assist in hiring a contractor with appropriate mowing equipment, including the NRCS WHIP Program (http://www.nrcs.usda.gov/Programs/whip/) and MassWildlife LIP Program (http://www.mass.gov/dfwele/dfw/dfw_lip.htm). However, these programs are often temporary and intended to recover the capacity of the landowner to manage the property on their own.

** In some cases herbicide applications may be the best alternative to control woody plants and avoid impacts to turtles. Make sure that you read and follow all state and federal regulations. Use the minimum amount and least toxic herbicide possible for desired outcome. Spot application to individual woody plants is preferred. Most of the herbicides used today are amino acid inhibitors acting on amino acids found only in plants. These prevent the plant from performing metabolically.

Land with Multiple Uses: Land where turtles and turtle habitat management is secondary to other management objectives (such as sportsmen's clubs, farmland, recreational areas, etc).

1) *Mower Style* – If mowing on a multi-year rotation, avoid flail mower heads with guide bars that ride along the ground. Sickle-bar mowers will likely have the least impact if mowing grassland and fields every 1-5 years. In areas with more woody vegetation >1-2" diameter a Brontosaurus-style mower will likely have the least impact on turtles.

2) *Blade Height* - Elevating the mowing deck height to 7 or even 12 inches (particularly during the 1st haying of the season) will reduce mortality and will leave important cover for animals. Shorter cuts during late summer second hay harvests are less likely to impact turtles.

   *Note: It is actually economically wise to mow fields using higher blade heights. The lower portions of the stem have relatively low nutritional value, it reduces blade wear, increases soil moisture retention which can increase yield of the second harvest, and reduces soil erosion (*Saumure 2006*).*

3) *Directionality* - If mowing during the active season is necessary, start mowing from the center of the field and use a back-and-forth approach, or large circular pattern, to avoid concentrating fleeing animals where they may be killed or stranded. In addition, leave an unmowed 10m strip around the perimeter of the field and mow this area last (see diagram in #5 above). Most turtles are found in these areas and this provides time for them to react to the mowing activity and move out of the area.

   There are three exceptions to this rule. The first is when a stream is within 100 m; in these cases it is best to start mowing the side furthest from the streams edge first and work your way towards the stream. The second exception is when the field is bordered by woodland, start mowing the sections of the field furthest from the woods and mow towards the woods. The third exception is when the field is bordered by a road; In this case start mowing the section next to the road first and work your way across the field.

4) *Mower Speed* – Mowing in low gear or at slow speeds will allow turtles to react and move out of the field.

Research Needs:

1) Behavior Data – We need data on the behavioral responses of turtles in reaction to mowers.
2) Blade Height Tests During Actual Field Mowing Events – We need to do tests on the blade height in fields as they are actually being mowed as part of regular maintenance at various sites.
3) The optimum mowing rotation for turtle habitat management.

References:

Jones, M. 2006. Personal Communication. University of Massachusetts, Amherst, MA

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